DETAILED ACTION

This office action is in response to the Appeal Brief filed January 18, 2008.

Reopened Prosecution

In view of an Applicant's Appeal Brief filed on January 18, 2008, PROSECUTION IS HEREBY REOPENED. A new non-final rejection is set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office Action is non-final) or a reply under 37 CFR 1.113 (if this Office Action is final); or,

(2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

An Applicant's Amendment filed on September 19, 2007 has been entered. Overall, claims 1-21 are pending in this application.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-10, and 13-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kiyohide (Patent Number 5,665,322) in view of Ban et al. (Ban) (Patent Number EP 0849444 A2).

Regarding claims 1, and 17-18, Kiyohide discloses an exhaust system (Abstract) for a lean-burn internal combustion engine comprising a soot filter, wherein the mass is compressed to provide a first packing density (**High Density**) (e.g. See col. 3, lines 50-67; col. 4, lines 1-42), and a catalyst located upstream of the filter for oxidising NO to NO2 for combusting soot collected on the filter in NO2, wherein the catalyst is supported on a metal substrate of the type used in the filter having a second packing density (**Low Density**) lower than the first packing density, to permit passage of soot particles (e.g. See Claims 3-8; col. 15, lines 1-67; col. 16-17, lines 1-67; col. 18, lines 1-60). However, Kiyohide fails to disclose that the soot filter packed with a mass of elongate, flat, narrow strip metal.

Ban discloses a lean-burn internal combustion engine comprising a soot filter (3) packed with a mass of elongate, flat, narrow strip metal (**mesh-like**) (Fig. 13) wherein the mass is compressed to provide a first packing density (**e.g. 4a, 4d, 4g**) (e.g. See col. 3, lines 50-67; col. 4, lines 1-42), and a catalyst located upstream of the filter, wherein the catalyst is supported on a metal substrate of the type used in the filter having a second packing density (**e.g. 4b, 4c, 4e, 4f, 4h, 4i**) lower than the first packing density, to permit passage of soot particles (e.g. See Figs. 1-10; page 5, lines 19-56; and page 8, lines 51-58).

It would have been recognized by one of ordinary skill in the art at the time the invention was made, that applying the known technique of using a soot filter packed with a mass of

elongate, flat, narrow strip metal as taught by Ban to the exhaust purifying system of Kiyohide, would have yielded predicable results and resulted in an improved system for reducing amount of soot emitting from a diesel internal combustion engine, to further improve the performance of the engine and the efficiency of the emission system. In addition, the Kiyohide and Ban references are known work in one of field of endeavor, and such modification is merely the use of known technique to improve a similar device by using a soot filter packed with a mass of elongate, flat, narrow strip metal, and such modification, i.e. choosing from a finite number of predictable solutions, is not of innovation but of ordinary skill and common sense. (See KSR International Co. v. Teleflex Inc., 550 U.S.--, 82 USPQ2d 1385 (April 30, 2007)).

Regarding claim 2, Kiyohide further discloses a plurality of metal-based filters adapted successively to trap smaller and smaller particles (e.g. See col. 3, lines 50-67; col. 4, lines 1-42)

Regarding claim 3, Kiyohide further discloses at least one wall flow filter for trapping yet smaller particles (e.g. See col. 3, lines 50-67; col. 4, lines 1-42).

Regarding claim 4, Kiyohide further discloses a flow-through monolith between each pair of metal-based filters (e.g. See col. 3, lines 50-67; col. 4, lines 1-42).

Regarding claim 5, Kiyohide further discloses that wherein the or each flow-through monolith comprises a NO oxidation catalyst, whereby to restore the NO2 content, which had been decreased by reaction with soot in the preceding filter (e.g. See Claims 3-8; col. 15, lines 1-67; col. 16-17, lines 1-67; col. 18, lines 1-60).

Regarding claim 6, Kiyohide further discloses that the filter capacity is sufficient to allow the soot to be combusted continuously by the oxidant (e.g. See col. 3, lines 50-67; col. 4, lines 1-42).

Regarding claim 7, Kiyohide further discloses that the filter capacity is sized for accumulations of soot sufficient to increase pressure-drop significantly before the next period of fast running and the system includes a bypass, wherein the pressure-drop through which is equal to the design maximum tolerated pressure-drop through the filter, whereby to avoid engine stalling (e.g. See col. 3, lines 50-67; col. 4, lines 1-42).

Regarding claim 8, Kiyohide further discloses means to limit soot emission to atmosphere located downstream of the bypass, which means being selected from the group consisting of a filter, an impingement collector and an oxidation catalyst (e.g. See col. 3, lines 50-67; col. 4, lines 1-42).

Regarding claim 9, Kiyohide further discloses that the filter comprises a regular coiled, woven or knitted structure (e.g. See col. 3, lines 50-67; col. 4, lines 1-42).

Regarding claim 10, Kiyohide further discloses that the metal of the filter is Type 300 or Type 400 stainless steel (e.g. See Claims 3-8; col. 15, lines 1-67; col. 16-17, lines 1-67; col. 18, lines 1-60).

Regarding claim 13, Kiyohide further discloses that the wherein the flat, narrow strip metal is a flattened wire (e.g. See Claims 3-8; col. 15, lines 1-67; col. 16-17, lines 1-67; col. 18, lines 1-60).

Regarding claim 14, Kiyohide further discloses that the filter packing carries a layer catalytic for soot oxidation (e.g. See Claims 3-8; col. 15, lines 1-67; col. 16-17, lines 1-67; col. 18, lines 1-60).

Regarding claim 15, Kiyohide further discloses that the catalytic layer comprising a washcoat and a component selected from the group consisting of Pt and oxides of Cs and V (e.g. See Claims 3-8; col. 15, lines 1-67; col. 16-17, lines 1-67; col. 18, lines 1-60).

Regarding claim 16, Kiyohide further discloses that the means for generating a component for combusting soot collected on the filter selected from the group consisting of ozone and plasma (e.g. See Claims 3-8; col. 15, lines 1-67; col. 16-17, lines 1-67; col. 18, lines 1-60).

Regarding claim 19, Kiyohide further discloses a flow through-monolith between each pair of metal-based filters (e.g. See Claims 3-8; col. 15, lines 1-67; col. 16-17, lines 1-67; col. 18, lines 1-60).

Regarding claim 20, Kiyohide further discloses that wherein the or each flow-through monolith comprises a NO oxidation catalyst, whereby to restore the NO2 content, which had been decreased by reaction with soot in the preceding filter (e.g. See Claims 3-8; col. 15, lines 1-67; col. 16-17, lines 1-67; col. 18, lines 1-60).

Claims 1-10, and 13-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Manson et al. (Manson) (Patent Number 6,248,689) in view of Maus (Patent Number 6,534,021).

Regarding claims 1, and 17-18, Manson discloses an exhaust system (e.g. Fig. 3-4) for a lean-burn internal combustion engine comprising a soot filter (e.g. 152, 174) packed with a mass of elongate, flat, narrow strip metal wherein the mass is compressed to provide a first packing density, and a catalyst (e.g. 150, 170) located upstream of the filter (e.g. 152, 174) for oxidising NO to NO2 for combusting soot collected on the filter in NO2, wherein the catalyst is supported

on a metal substrate of the type used in the filter having a second packing density lower than the first packing density, to permit passage of soot particles (e.g. See Figs. 3-4; col. 6, lines 50-67; col. 7, lines 1-63). However, Manson fails to disclose that the soot filter packed with a mass of elongate, flat, narrow strip metal.

Maus discloses a lean-burn internal combustion engine comprising a soot filter (1) packed with a mass of elongate, flat, narrow strip metal (e.g. 1.1, 1.2, 1.3, 9.1, 9.2, 9.3) wherein the mass is compressed to provide a first packing density (e.g. 1.1, 9.1) (e.g. See col. 3, lines 50-67; col. 4, lines 1-42), and a catalyst located upstream of the filter, wherein the catalyst is supported on a metal substrate of the type used in the filter having a second packing density (**e.g.** e.g. 1.2, 1.3, 9.2, 9.3) lower than the first packing density, to permit passage of soot particles (e.g. See Figs. 1-7; col. 11, lines 1-67; and col. 12, lines 1-50).

It would have been recognized by one of ordinary skill in the art at the time the invention was made, that applying the known technique of using a soot filter packed with a mass of elongate, flat, narrow strip metal as taught by Maus to the diesel engine exhaust purifying system of Manson, would have yielded predicable results and resulted in an improved system for reducing amount of soot emitting from a diesel internal combustion engine, to further improve the performance of the engine and the efficiency of the emission system. In addition, the Manson and Maus references are known work in one of field of endeavor, and such modification is merely the use of known technique to improve a similar device by using a soot filter packed with a mass of elongate, flat, narrow strip metal, and such modification, i.e. choosing from a finite number of predictable solutions, is not of innovation but of ordinary skill and common sense. (See KSR International Co. v. Teleflex Inc., 550 U.S.--, 82 USPQ2d 1385 (April 30, 2007)).

Regarding claim 2, Manson further discloses a plurality of metal-based filters (e.g. 10) adapted successively to trap smaller and smaller particles (e.g. See col. 6, lines 50-67; col. 7, lines 1-63).

Regarding claim 3, Manson further discloses at least one wall flow filter for trapping yet smaller particles (e.g. See col. 6, lines 50-67; col. 7, lines 1-63).

Regarding claim 4, Manson further discloses a flow-through monolith between each pair of metal-based filters (e.g. See col. 6, lines 50-67; col. 7, lines 1-63).

Regarding claim 5, Manson further discloses that wherein the or each flow-through monolith comprises a NO oxidation catalyst, whereby to restore the NO2 content, which had been decreased by reaction with soot in the preceding filter (e.g. See col. 6, lines 50-67; col. 7, lines 1-63).

Regarding claim 6, Manson further discloses that the filter capacity is sufficient to allow the soot to be combusted continuously by the oxidant (e.g. See col. 6, lines 50-67; col. 7, lines 1-63).

Regarding claim 7, Manson further discloses that the filter capacity is sized for accumulations of soot sufficient to increase pressure-drop significantly before the next period of fast running and the system includes a bypass, wherein the pressure-drop through which is equal to the design maximum tolerated pressure-drop through the filter, whereby to avoid engine stalling (e.g. See col. 6, lines 50-67; col. 7, lines 1-63).

Regarding claim 8, Manson further discloses means to limit soot emission to atmosphere located downstream of the bypass, which means being selected from the group consisting of a

filter, an impingement collector and an oxidation catalyst (e.g. See col. 6, lines 50-67; col. 7, lines 1-63).

Regarding claim 9, Manson further discloses that the filter comprises a regular coiled, woven or knitted structure (e.g. See col. 6, lines 50-67; col. 7, lines 1-63).

Regarding claim 10, Manson further discloses that the metal of the filter is Type 300 or Type 400 stainless steel (e.g. See col. 6, lines 50-67; col. 7, lines 1-63).

Regarding claim 13, Manson further discloses that the wherein the flat, narrow strip metal is a flattened wire (e.g. See col. 6, lines 50-67; col. 7, lines 1-63).

Regarding claim 14, Manson further discloses that the filter packing carries a layer catalytic for soot oxidation (e.g. See col. 6, lines 50-67; col. 7, lines 1-63).

Regarding claim 15, Manson further discloses that the catalytic layer comprising a washcoat and a component selected from the group consisting of Pt and oxides of Cs and V (e.g. See col. 6, lines 50-67; col. 7, lines 1-63).

Regarding claim 16, Manson further discloses that the means for generating a component for combusting soot collected on the filter selected from the group consisting of ozone and plasma (e.g. See col. 6, lines 50-67; col. 7, lines 1-63).

Regarding claim 19, Manson further discloses a flow through-monolith between each pair of metal-based filters (e.g. See col. 6, lines 50-67; col. 7, lines 1-63).

Regarding claim 20, Manson further discloses that wherein the or each flow-through monolith comprises a NO oxidation catalyst, whereby to restore the NO2 content, which had been decreased by reaction with soot in the preceding filter (e.g. See col. 6, lines 50-67; col. 7, lines 1-63).

Claims 11-12 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kiyohide in view of Ban, and further in view of design choice.

Regarding claims 11-12, and 21, Kiyohide in view of Ban discloses all the claimed limitation as discussed above except that the iron alloy containing at least 11.5% Cr, 4% Al and 0.02-0.25%, and the width of the metal strip of the filter is up to 2 mm and its thickness is 0.2 to 0.8 times its width.

Regarding the specific range of the compositions of the iron alloy, and the width and thickness of the metal strip, it is the examiner's position that a range of at least 11.5% Cr, 4% Al and 0.02-0.25% the compositions of the iron alloy, and up to 2 mm and its thickness is 0.2 to 0.8 times its width of the filter metal strip, would have been an obvious matter of design choice well within the level of ordinary skill in the art, depending on variables such as mass flow rate of the exhaust gas, as well as the size of the engine, properties of materials for making the NOx catalyst and soot filter, and the controlled temperature of the catalytic converter and soot filter. Moreover, there is nothing in the record which establishes that the claimed parameters present a novel or unexpected result (See In re Kuhle, 562 F. 2d 553, 188 USPQ 7 (CCPA 1975)).

Under some circumstances, however, changes such as these may impart patentability to a process if the particular ranges claimed produce a new and unexpected result which is different in kind and not merely in degree from the results of the prior art. In re Dreyfus, 22 CCPA (Patents) 830, 73 F.2d 931, 24 USPQ 52; In re Waite et al., 35 CCPA (Patents) 1117, 168 F.2d 104, 77 USPQ 586. Such ranges are termed "critical" ranges, and the applicant has the burden of proving such criticality. In re Swenson et al., 30 CCPA (Patents) 809, 132 F.2d 1020, 56 USPQ 372; In re Scherl, 33 CCPA (Patents) 1193, 156 F.2d 72, 70 USPQ 204. However, even though

applicant's modification results in great improvement and utility over the prior art, it may still not be patentable if the modification was within the capabilities of one skilled in the art. In re Sola, 22 CCPA (Patents) 1313, 77 F.2d 627, 25 USPQ 433; In re Normann et al., 32 CCPA (Patents) 1248, 150 F.2d 627, 66 USPQ 308; In re Irmscher, 32 CCPA (Patents) 1259, 150 F.2d 705, 66 USPQ 314. More particularly, where the general conditions of a claim are disclosed in the prior art, it is not inventive to discover the optimum or workable ranges by routine experimentation. In re Swain et al., 33 CCPA (Patents) 1250, 156 F.2d 239, 70 USPQ 412; Minnesota Mining and Mfg. Co. v. Coe, 69 App. D.C. 217, 99 F.2d 986, 38 USPQ 213; Allen et al. v. Coe, 77 App. D.C. 324, 135 F.2d 11, 57 USPQ 136.

Response to Arguments

Applicant's arguments filed January 18, 2008 have been fully considered but they are not completely persuasive. Claims 1-21 are pending.

Applicant's cooperation in explaining the claims subject matter more specific to overcome the claim rejection is appreciated.

Applicants' s arguments with respect to claims 1-21 have been considered but are moot in view of the new ground(s) of rejection as discussed above.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Binh Tran whose telephone number is (571) 272-4865. The examiner can normally be reached on Monday-Friday from 8:00 a.m. to 4:00 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thomas E. Denion, can be reach on (571) 272-4859. The fax phone numbers for the organization where this application or proceeding is assigned are (571) 273-8300 for regular communications and for After Final communications.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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